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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

ART UNIT

PAPER NUMBER

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/534,043

Applicant(s)

SHINOHARA ET AL.

Examiner

Chris C. Chu

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 - 4, 6, and 8 - 13 is/are rejected.
- 7) ☒ Claim(s) 5 and 7 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 March 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1) ☒ Certified copies of the priority documents have been received.
2) ☐ Certified copies of the priority documents have been received in Application No. ____.
3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other

DETAILED ACTION

Drawings

1. Figure 9 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the thickness of said second metal plate is equal to the thickness of said first metal plate in claim 3, lines 4 and 5, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

2. Applicant is required to submit a proposed drawing correction in reply to this Office action. However, formal correction of the noted defect can be deferred until the application is allowed by the examiner.

Claim Objections

3. Claims 5 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 5 and 7 contains allowable subject matter because none of references of record teach or suggest, either singularly or in combination, at least the limitation of an adhesive filling a gap between part of said flange which is out of contact with said third conductive pattern and said first main surface.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. Claims 1 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Hirose et al.

Note Fig. 16B of Hirose et al., where the reference shows a semiconductor module mountable on an external heat sink (5), said semiconductor module comprising: an insulating substrate (1, 11, and 8) for said semiconductor module, said insulating substrate (1, 11, and 8) including a substrate (1), a first conductive pattern (8) formed on a first main surface of said substrate which is on the opposite side from said external heat sink (see Fig. 16B), and a second conductive pattern (11) formed on a second main surface of said substrate which is on the same side as said external heat sink and for contact with said external heat sink (see Fig. 16B); and a mounting frame (3) made of metal (column 10, lines 16 ~ 19) and having a mounting surface for contact with said external heat sink (see Fig. 16B), said mounting frame (3) including a flange (see Fig. 16B) along a periphery thereof for engagement with a peripheral part of said insulating substrate at said first main surface (see Fig. 16B), said flange pressing said peripheral part of said insulating substrate toward said external heat sink to force said insulating substrate into pressure contact with said external heat sink. As to the language on lines 11 ~ 13 of claim 1, "said flange pressing said peripheral part of said insulating substrate toward said external heat sink to force

said insulating substrate into pressure contact with said external heat sink”, applicant should note that this is merely “result or function” language which cannot be relied upon to define over Hirose et al., since Hirose et al. discloses all of the claimed elements and their recited relationships. Moreover, the examiner will presume that the recited results are inherent in Hirose et al., since all of the claimed elements and the relationships therebetween are met by Hirose et al. If the recited result or function is not inherent in Hirose et al., then this would mean that applicant has failed to recite one or more critical features of the present invention (i.e., a problem under 112, first paragraph).

Regarding claim 6, note Fig. 16B of Hirose et al., where the reference shows wherein said insulating substrate (1) further includes a third conductive pattern (2) formed on said first main surface along a periphery of said substrate (see Fig. 16B); and wherein said flange (see Fig. 16B) and said insulating substrate (1) contact each other, with said third conductive pattern (2) therebetween (see Fig. 16B).

6. Claims 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Schulz-Harder et al.

Note Fig. 1 of Schulz-Harder et al., where the reference shows an insulating substrate for a semiconductor module, said insulating substrate (2) comprising a mounting surface (see Fig. 1), said mounting surface being adapted to be forced into pressure contact with an external heat sink (6) by a mounting frame (8 in Fig. 3) pressing a peripheral part of said insulating substrate (see Fig. 1 and Fig. 3), said insulating substrate (2) having a curved configuration (see Fig. 1) in

which a peripheral part of said mounting surface warps upwardly away from said external heat sink (6) above a central part of said mounting surface (see Fig. 1).

Regarding claim 12, note Fig. 1 of Schulz-Harder et al., where the reference shows further comprising: a substrate (2); a first conductive pattern (3) formed on a first main surface of said substrate which is on the opposite side from said external heat sink (see Fig. 1); and a second conductive pattern (4) formed on a second main surface of said substrate which is on the same side as said external heat sink and having a bottom surface serving as said mounting surface (see Fig. 1), wherein all of said substrate, said first conductive pattern and said second conductive pattern are curved (see Fig. 1).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2 ~ 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose et al.

Hirose et al. discloses the claimed invention except for said mounting frame further includes: a first metal plate having said mounting surface; and a second metal plate disposed on said first metal plate and having a protrusion along a periphery thereof projecting from a periphery of said first metal plate to define said flange. It would have been obvious to one having ordinary skill in the art at the time the invention was made to including two metal plates to form

the mounting frame, which includes a first metal plate having said mounting surface; and a second metal plate disposed on said first metal plate and having a protrusion along a periphery thereof projecting from a periphery of said first metal plate to define said flange, since it has been held that constructing a formerly integral structure in various element involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. The ordinary artisan would have been motivated to modify Hirose et al. in the manner described above for at least the purpose of decreasing a cost for manufacturing the metal frame.

Regarding claim 3, note Fig. 16B of Hirose et al., where the reference shows the thickness of said first metal plate (bottom part of 3) is equal to the sum of the thickness of said substrate and the thickness of said second conductive pattern (see Fig. 16B) except wherein the thickness of said second metal plate is equal to the thickness of said first metal plate. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to having the thickness of said second metal plate is equal to the thickness of said first metal plat, since such a modification would have involved a mere change in the thickness of a component. A change in size or thickness is generally recognized as being within the level of ordinary skill in the art. The ordinary artisan would have been motivated to modify Hirose et al. in the manner described above for at least the purpose of increasing weight of the frame. In re Rose, 105 USPQ 237 (CCPA 1955).

Regarding claim 4, note Fig. 16B of Hirose et al., where the reference shows wherein said insulating substrate (1) further includes a third conductive pattern (2) formed on said first main surface along a periphery of said substrate (see Fig. 16B); and wherein said flange (see Fig.

16B) and said insulating substrate (1) contact each other, with said third conductive pattern (2) therebetween (see Fig. 16B).

9. Claim 8 ~ 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose et al. in view of Mertol.

Hirose et al. discloses all of the claimed invention except an insulative material between said flange and said first conductive pattern. However, Mertol discloses an insulative material (6 in Fig. 8) between said flange (16 in Fig. 8) and said first conductive pattern (see Fig. 8). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Hirose et al. by including an insulative material between said flange and said first conductive pattern as taught by Mertol. The ordinary artisan would have been motivated to modify Hirose et al. in the manner described above for at least the purpose of increasing security of the stiffener to the substrate (column 7, lines 37 ~ 39).

Regarding claim 9, Hirose et al. discloses all of the claimed invention except a cylindrical case disposed on a main surface of said mounting frame which is on the opposite side from said external heat sink; said case, said mounting frame and said insulating substrate defining a space surrounding said semiconductor device; and an insulative sealing material filling said space. However, Mertol discloses a cylindrical case (19 in Fig. 12), a space surrounding said semiconductor device (see Fig. 12), and an insulative sealing material (6) filling said space (see Fig. 12). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Hirose et al. by including a cylindrical case, a space surrounding said semiconductor device, and an insulative sealing material filling said space as taught by

Mertol. The ordinary artisan would have been motivated to modify Hirose et al. in the manner described above for at least the purpose of increasing reliability of the package.

Regarding claim 10, Hirose et al., as modified, discloses wherein said sealing material is a thermosetting resin (column 6, lines 45 ~ 47).

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schulz-Harder et al. in view of Kuhnert et al.

Schulz-Harder et al. discloses all of the claimed invention except only the bottom surface of said second conductive pattern is curved because of a difference in thickness between a central part of said second conductive pattern and a peripheral part thereof. However, Kuhnert et al. discloses only the bottom surface (6 in Fig. 1) of said second conductive pattern (1 in Fig. 1) is curved because of a difference in thickness between a central part of said second conductive pattern and a peripheral part thereof (see Fig. 1). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Schulz-Harder et al. by including a difference in thickness between a central part of said second conductive pattern and a peripheral part, so only the bottom surface of said second conductive pattern is curved, as taught by Kuhnert et al. The ordinary artisan would have been motivated to modify Schulz-Harder et al. in the manner described above for at least the purpose of improving bond between the substrate and the heat sink.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Stockmeier, Sato et al., and Nagase et al. disclose a semiconductor module.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
October 1, 2001



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